UNITED STATES SENATE

Committee on Commerce, Science and Transportation

Hearing on Rail Freight Transportation in North Dakota

Senator Byron Dorgan, Presiding

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Bismarck, North Dakota

Good afternoon. For the record my name is Gene Griffin, Director of the Upper Great Plains Transportation Institute, North Dakota State University. The Institute is a free standing research unit within NDSU focusing on small urban and rural transportation issues. The Institute has concentrated a significant portion of its effort on agricultural transportation issues during its 35 year existence and is uniquely qualified to address some of the important rail pricing and service issues that are currently raising concerns among grain producers and shippers. A number of Institute Research Fellows were collectively responsible for developing this testimony including: Denver Tolliver, Senior Research Fellow; John Bitzan, Advanced Research Fellow; and Mark Berwick, Associate Research Fellow.

I would like to preface my statement by pointing out that the United States production agriculture industry is critically dependent on an efficient and effective transportation and distribution logistical system. Recent research suggests that it is the distribution system which makes the U.S. grain producing industry competitive in the global economy. It is also important to recognize that some of those efficiencies must be passed on through the supply chain to have an impact on the delivered price of grain. Regardless of exactly how the distribution of efficiency gains eventually takes place, it should be emphasized that an efficient, reliable, and equitable transportation system is critical to the viability of agriculture in the United States, one of the major industrial sectors of the U.S. economy.

There appears to be three fundamental issues that are causing a great deal of consternation among grain producers and shippers, as well as those public sector entities responsible for transportation. They are: (1) the 110 car shuttle train program being developed by the BNSF; (2) the manner in which this program is being implemented; and (3) the so-called inverse rate structure. There is a great deal of anecdotal evidence regarding all three of these issues as well as much second-hand information. There is little hard reliable data to evaluate these from a research perspective, thus my remarks will be largely conceptual in nature and somewhat speculative. However, I will present more conclusive findings on rail cost and rate relationships as well as an estimate of the road impacts that could result from the 110 car system. Finally, I will conclude with a general statement about my perceptions of the adequacy of the regulatory system as it applies to rail pricing and service.

110 Car Shuttle Train Program

The BNSF introduced the shuttle train program approximately two years ago, presumably in an effort to continue to improve efficiency in the transportation of grain. This effort has been taking place in the railroad industry since the1890's when the ICC approved lower rates on carload lots versus less-than-carload consignments. Further, the multiple car rate system was formally ushered into the U.S. business system when ICC allowed lower rates on multiple car shipments of black strap molasses from New Orleans to Peoria., IL in 1939[1]. It should be noted that the differential in rates was generally deemed to be related to the gains in efficiencies.

Multiple car rates on grain were first introduced in North Dakota in 1980. Since that time a series of programs and adjustments consisting of 26 car rates, 52 car rates, co-loading, Certificate of Transportation program (COTS), and other service options have been introduced leading to increased rail grain transportation efficiency. This has been part of a larger phenomena of major changes in production agriculture and highway transportation characterized by larger farm equipment, better road and highway system, larger trucks, and significant advances in production technology. This has resulted in larger farms and consolidation of the country grain merchandising system.

The impacts of these changes have been significant. There has been increased truck traffic, particularly local. Farm truck size has correspondingly increased as well. The branchline system has been reduced significantly with a resulting shift in traffic to the roads. Concentration in the country elevator industry has also been significant as well with 100 of the largest elevators doing 58% of the merchandising business in 1985-86 compared to 72% of the business in 2000-01.[2] For some, there has also been a reduction in rates, presumably resulting in short term increases in farm prices. However, the long term impact on prices is less clear and will depend on a number of factors that are difficult to predict such as the intensity of global competition, the degree of inter and intramodal competition, the continued existence of the Canadian Wheat Board, and the future of the farm program, to mention a few.

As in all change, there are winners and losers resulting from the transformation taking place in the rail grain system. It is intuitive how each will react to such changes. However, there are fundamental questions that need to be addressed. Does the states' grain producing sector need continued advances in the grain handling and transportation system to remain economically viable in a highly competitive global market system? Are cost efficiencies gained by railroads reflected, to some degree, in rail rates? What are the impacts on traffic patterns of both local and long haul trucking and what are the corresponding impacts on the local, state, and federal road and highway system? Although this is not a complete set of questions of all the important issues, a final question is the method of implementation of these systems. Do they provide an equal

[1]Phillip Locklin, Economics of Transportation, Richard D. Irwin, Inc., Seventh Edition, 1972, pp 475-476.

[2]Kimberly Vachal, Annual North Dakota Elevator Marketing Report, 2000-01, Upper Great Plains Transportation Institute, North Dakota State University, UGPTI Publication No. 141, November 2001, p. 2.

opportunity for all shippers to compete for fewer viable number of country grain stations. This seems to be an issue with the implementation of the 110 car shuttle train program.

Implementation of the 110 Car Shuttle Train Program

There is no documentable evidence or data available to address this issue because of the private and proprietary nature of contracts, thus it is speculative in nature. However, there is a consistency, frequency, and abundance of hearsay evidence that would lead the average person to believe there is something to the allegation that special contract rate agreements have been developed with certain shippers giving them an advantage over others in developing a 110 car facility. These contracts most likely take the form of rebates on shipments of grain conforming to certain loading, unloading, origin, and consignment size standards.

The issue seems to be that this method of promoting the movement of a 110 car system has not been widely available to all or even a majority of shippers. This would appear to conflict with basic human nature, although it may be warranted from a business perspective. Recent experimental economic research indicates that as human beings, we have an inherent bias towards fairness within groups.[3] However, it should be noted that it would be unreasonable to expect that a large number of the existing country elevators would be able to participate in this program without an extensive amount of excess storage and throughput capacity being developed. Excess capacity that would be paid for, in the most part, by producers, especially if the facilities are dominated by farmer-owned cooperative facilities. It does seem that there might have been a mechanism to limit the development of such facilities consistent with the demand, while still being seemingly fairer in the eyes of country grain elevator interests.

The most controversial of the three issues mentioned in the beginning of this statement appears to be the so-called inverse rate.

Inverse Rate on Wheat to the Pacific Northwest (PNW)

There is hearsay that BNSF has instituted contract rates for wheat originating at shuttle facilities to the Pacific Northwest market that are inversely proportional to distance. In other words, they charge a lower rate for a longer haul. Thus, rates to the PNW from western North Dakota are higher than similar rates from eastern North Dakota. Since these are contract rates they are proprietary in nature and are not published. However, they have been estimated by various people in the country grain industry and key points are exhibited in Figure 1. It should be emphasized that the accuracy of these rates cannot be verified (while the rates reported herein are based on conjecture there seems to be no dispute that they do exist). However, if they do exist, it intuitively seems to be unfair. That does not mean there is not a sound business reason for the implementation.

[3]Karl Sigmund, Ernst Fehr, and Martin Nowak, The Economics of Fair Play, Scientific American, January, 2002.

It should be pointed out that this is not the first instance in which there has been inverse rates to the PNW. Railroads published inverse rates on wheat to the PNW from North Dakota in the

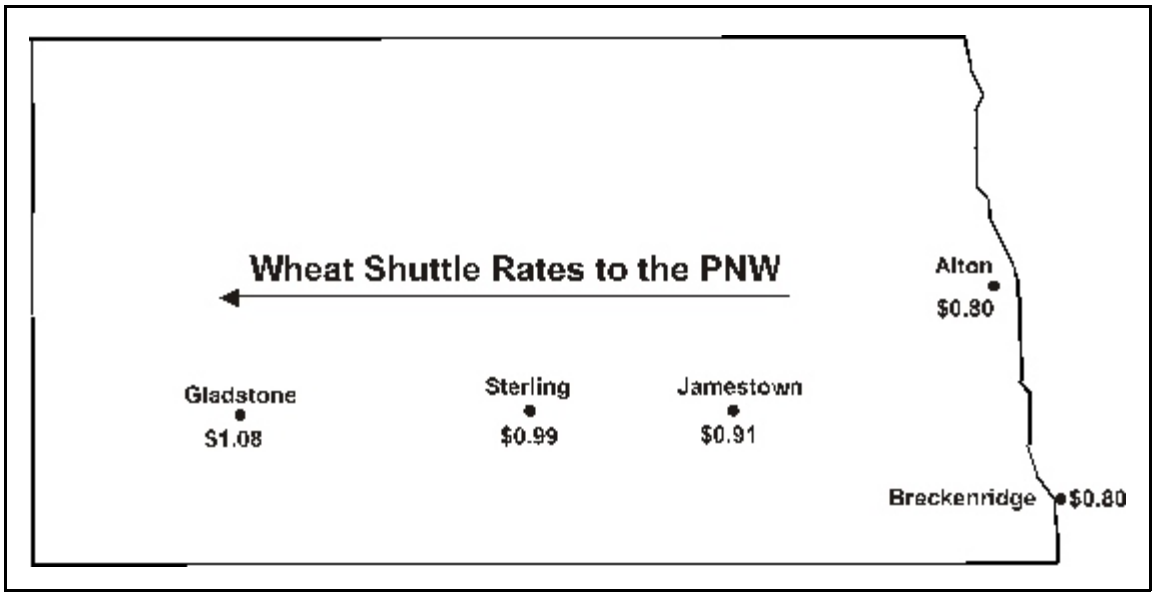

Figure 1. Reported Westbound Wheat Rates from Select North Dakota Origins

1960's and 70's in an effort to promote wheat sales to the Pacific Rim countries off the PNW. This program, although successful, was eliminated and replaced with distance-based rates sometime in the 1980's, due in part to criticism from producers.

Two questions arise resulting from the inverse rate: (1) why would the BNSF develop such a contract rate, and (2) what are its impacts. There is at least one plausible reason for the inverse rate; that is to pull grain away from competing railroads and waterways. The inverse rate would make it possible to pull grain from farther east in the producing territory, allowing eastern North Dakota and western Minnesota grain to fill the PNW market. This could effectively displace Canadian wheat, wheat from the central plains states and also wheat moving by barge to the gulf.

The more difficult question to answer is what is the impact. Does it displace wheat from more traditional market territory in western North Dakota? If it does, such rates may be in violation of regulations governing rail rates. Also, the question of its effect on farm prices is another issue, albeit, a difficult one to answer.

Another question is the impact on filling traditional markets with wheat of different characteristics from different producing areas of the region. The markets in Asia are extremely conscious of specific milling and baking characteristics and have come to depend on quality and end-use performance traits associated with the hard red spring wheats produced in the drier, less disease-prone areas of western North Dakota and eastern Montana. However, under the current inverse rate structure, spring wheats produced in the eastern part of the region are now more

likely to move to PNW terminals for eventual shipment to Asian destinations, rather than traditional domestic or gulf export positions.

These wheats, which under normal conditions are not tributary to PNW markets, are typically lower in protein content and often have lower gluten strength. Challenges in functionality and performance are also more likely to arise due to negative impacts resulting from disease pressures more often associated with eastern production areas.[4]

Increased incidence of processor concerns has been noted by US Wheat Associates personnel in regional offices in Asia and is thought to be related to the inverse rate structure. This could harm the overall market development efforts that have been so successful over the past four decades.

As stated earlier, much of what has been addressed is speculative and conceptual in nature. There are two issues that can be addressed in a more definitive and researchable manner, rail revenue/cost ratios and the impact on roads.

Rail Revenue/Cost Ratios

In addition to the controversy surrounding the implementation of the 110-car shuttle program and the so-called inverse rate structure, there are also allegations that the rates charged by the BNSF to North Dakota shippers are unreasonably high. In order to make an assessment of whether such an allegation is true, the Upper Great Plains Transportation Institute performed a detailed analysis of North Dakota rail wheat rates and costs on the BNSF.

Two types of analysis were performed to make an assessment of the reasonableness of rail rates to North Dakota wheat shippers: (1) an analysis of BNSF revenue-to-variable cost ratios for wheat originating in North Dakota from the 2000 annual railroad waybill sample, and (2) an analysis of BNSF revenue-to-variable cost ratios for wheat originating in North Dakota and terminating in Minneapolis or Portland using the current rate structure and an operationally specific costing methodology. While a detailed analysis of revenue-to-variable cost ratios is provided in Appendix A to this statement, I would like to present a summary of the findings to the committee.

In analyzing revenue-to-variable cost ratios for BNSF wheat shipments from North Dakota, we examined several origins and service levels. Specific service levels examined included 1-25 cars, 26-52 cars, co-loading of 110 car shipments from two stations, and 110-car shuttle train shipments from a single origin. Average revenue-to-variable cost ratios for BNSF wheat shipments to various markets at all service levels from the 2000 rail waybill analysis are shown in Table 2 of Appendix A, while average revenue-to-variable cost ratios to Portland and

[4]Personal Communications, Neal Fisher, Administrator, North Dakota State Wheat Commission, Bismarck, ND, March 21, 2002.

Minneapolis with the current rate structure are shown in Tables 3 and 6 of Appendix A, respectively.

The 2000 waybill analysis of revenue-to-variable cost ratios and the analysis of current revenue-to-variable cost ratios for BNSF wheat movements to Portland and Minneapolis paint a similar picture. Both analyses suggest that North Dakota wheat shipments to Portland and Minneapolis are highly profitable for the BNSF. For all service levels in either analysis, the average revenue-to-variable cost ratio to either market is at or above 1.85. Moreover, for all service levels of 26 cars or more to either market, the average revenue-to-variable cost ratios exceed 2.43. For all service levels of 52 cars or more to either market, the average revenue-to-variable cost ratios exceed 2.7.

While all of these revenue-to-variable cost ratios seem high, one must put them in the context of rate reasonableness guidelines to determine if they are unreasonably high. These guidelines provide insight into equity considerations and revenue adequacy considerations that should be taken into account when making an assessment of the magnitude of a particular rail rate.

Although a revenue-to-variable cost ratio of 180 percent is often used as a baseline for comparison, rail rates above the 180 percent of variable costs are not necessarily unreasonable. The 180 percent of variable cost figure comes from a Congressional determination that rates exceeding this level can be examined for market dominance. That is, if a rail rate exceeds 180 percent of variable costs, then the shipper can try to establish market dominance by examining the extent of intramodal and intermodal competition. If a rate above 180 percent is shown, and it is shown that intramodal and intermodal competition do not serve to effectively discipline rates, then market dominance is established. Subsequently, the Surface Transportation Board examines other measures in making an assessment of whether or not rates are reasonable.

In its simplified rail rate guidelines, the Surface Transportation Board uses three measures to establish the reasonableness of a rail rate. These measures consider the equity of similarly situated shippers, the revenue adequacy needs of the railroad, and the reasonableness of the carrier's revenue requirements borne by a shipper or group of shippers. The three measures include: the revenue shortfall allocation method (RSAM), the average revenue-to-variable cost percentage for all shipments with revenue-to-variable cost percentages above 180 ($RVC_{>180}$), and the average revenue-to-variable cost ratio on comparable shipments (RVC_{COMP}).

As recognized by the Surface Transportation Board, none of these measures can be used alone to make an assessment of whether a rate is reasonable, but in combination they provide a good baseline for examining the level of various rates. RSAM measures the uniform markup above variable cost that would be needed from every shipper of potentially captive traffic (traffic with revenue-to-variable cost ratios above 180 percent) in order for the carrier to recover all of its costs. The RSAM recognizes the need for differential pricing by the railroad, and the railroad's need for revenue adequacy.

$RVC_{>180}$ measures the average markup for all of the railroad's traffic that moves at rates exceeding variable costs by 180 percent or more. The idea behind the $RVC_{>180}$ measure is that a particular shipper should not be bearing an unreasonable share of the carrier's revenue requirements relative to other potentially captive traffic. Moreover, an interesting comparison between the $RVC_{>180}$ and the RSAM can be made. An $RVC_{>180}$ that exceeds the RSAM suggests that the railroad is meeting its revenue adequacy requirements. Such a finding may be further justification for a rate reduction.

RVC_{COMP} measures the average markup on traffic of similar commodities moving under similar transportation conditions. It is designed to serve as a comparison with traffic that has a similar elasticity of demand. The idea is that a shipper should not be penalized for being on a railroad that has higher revenue needs from its potentially captive traffic. Because of the short time frame for performing our analysis, we were not able to provide revenue-to-variable cost ratios for comparable traffic in this statement.

Table 9 of Appendix A shows the RSAM and the $RVC_{>180}$ for the BNSF in the most recent four years calculated by the STB. In the RSAM column, there are two numbers listed. The difference between the two columns is an efficiency adjustment. The first column, which includes an efficiency adjustment, eliminates all movements that have revenues of less than URCS variable costs in calculating the revenue shortfall that must be paid by captive shippers. The rationale for this adjustment is that captive shippers should not be forced to cross-subsidize shipments that are not earning their attributable costs. The second column does not include any such adjustment. The size of the adjustment that should be used is an empirical question. The AAR argues that the adjustment is too large, with URCS variable costs reflecting some unattributable costs, while many shippers argue that the full adjustment serves as a proxy for railroad inefficiencies. The STB suggests that a number between the adjusted and the unadjusted is appropriate, since there are assets in the railroad industry that would not warrant replacement when they become unusable.

In comparing the numbers in Table 9 with the revenue-to-variable cost ratios in Tables 2, 3, and 6, you will notice that the RSAM is below average revenue-to-variable cost ratios for North Dakota wheat to many markets, whether an efficiency adjustment is made or not. Moreover, the number of revenue-to-variable cost ratios that exceed the RSAM increases when such an efficiency adjustment is made. Similarly, many North Dakota wheat shipments show revenue-to-variable cost ratios that exceed the average charged by BNSF to potentially captive shippers. Finally, a comparison between the RSAM and the average revenue-to-variable cost ratio charged to potentially captive shippers by the BNSF shows that in the most recent year, the average revenue-to-variable cost ratio charged to potentially captive shippers exceeds the RSAM with or without the efficiency adjustment. This suggests that BNSF is charging an average rate to its captive shippers that exceeds the average rate necessary for the railroad to cover all of its costs, including a return on investment. This is compelling evidence that the BNSF's rates to many North Dakota shippers may exceed reasonable limits.

Relative Efficiencies of Service Level Options

While rates on the BNSF for North Dakota wheat shipments appear to be high relative to costs, it is important to note that the overall rate levels associated with larger shipment sizes are lower for North Dakota shippers. Thus, these larger service level options provide an important benefit to North Dakota shippers.

An important economic question is: what are the relative efficiency gains of 110-car unit train movements to the Pacific Northwest? Appendix A presents detailed comparisons for 84 stations in North Dakota. I will use one of these stations, Hillsboro, to illustrate the magnitude of the potential efficiency gains.

Hillsboro is located 40 miles south of Grand Forks and 1,553 miles from Portland. An existing shuttle-train facility is located in the vicinity of Hillsboro. In the BNSF tariff, single-car, 26-car, 52-car, and 110-car rates are published for Hillsboro. In addition, a 110-car co-loading rate is published for Hillsboro. Table 1 shows the estimated variable cost for shipping wheat from Hillsboro to Portland in 286,000-pound rail cars. The costing methods and data used in these calculations are documented in the appendix.

Table 1: Illustration of the Relative Efficiencies of 110-Car Consignments

Service Level	Variable Cost per Car
1-Car	$2,732
26-Car	$1,974
52-Car	$1,710
110-Car Two-Origin	$1,498
110-Car Single-Origin	$1,454

As Table 1 shows, the estimated variable cost for the 110-car single-origin shipment is 47 percent lower than the estimated variable cost of a single-car shipment from the same origin. Moreover, the estimated 110-car cost is 25 percent lower than the estimated variable cost of a 26-car shipment. Although an individual 52-car shipment is often referred to as a "unit train," it does not offer the same efficiencies as a 110-car train. Typically, a 52-car shipment must be matched with one of similar size or with several smaller multi-car blocks before a large grain train can be assembled. On average, the single car shuttle results in a 15 percent savings in comparison to the 52-car shipment.

This comparison probably understates the efficiency gains from shuttle trains because there are certain operational and car utilization effects that cannot be captured with a costing formula.

Nevertheless, the illustration suggests that 110-car trains offer the potential for large efficiency gains, greatly reducing the cost of long-distance movements to the Pacific Northwest.

Road Impacts

One reason the 110-car shuttle program and the so-called inverse rate structure mentioned previously are controversial is because of the potential road impacts resulting from each. The UGPTI examined case studies of Jamestown, Berthold, and Milton in order to make an assessment of some of the potential road impacts resulting from these programs.

While details of these case studies are presented in Appendix C, I will briefly summarize the results of the case studies now. The Jamestown case study showed an average incremental distance hauled as a result of the shuttle facility of 5.3 miles for every bushel (Table 3 of Appendix C).[4] For Berthold, the extra distance from the shuttle program was estimated at 1.8 miles. For Milton the extra distance from the shuttle program was estimated at 4.5 miles per bushel. It is important to note that these estimates are based on simulated case studies, and some movements may be much farther than the estimated incremental miles.

Appendix B in this study provides background cost estimates associated with truck traffic over different types of highways using different types of trucks. Appendix B was developed to estimate road impacts, resulting from a shift in grain flows because of shuttle facilities and or inverse rates. Table 10 in Appendix B presents flexible pavement impact factors for the 5-axle semi truck which, for efficiency reasons, is the truck of choice for moving longer distances from on-farm storage facilities to elevator terminals. This truck is able to haul approximately 900 bushels and provides significantly less damage to roadways than the single axle truck. The longer hauling distance may have two results that negate road impacts. First, a shift may occur to the 5-axle semi from other types of trucks. Second, these extra miles may be on rural interstate or the Federal Highway System where the lowest highway impacts would occur.

Because it is difficult to determine the type of roadway the extra miles of travel would include, an average of the costs of different functional classes from Table 14 in Appendix B is used. This results in an average estimate per truck-mile of 58 cents. It should also be noted that on the interstate system the 5-axle semi truck hauling a legal load provides a very low impact, and is offset by user fees through state fuel tax collections and other user fees.

In the Jamestown scenario, the impacts of an additional 6700 trucks hauling an estimated 5.8 miles results in annual road impacts of over $20,000. For Berthold the impacts are almost none. In the Milton case, annual road impacts are estimated at $32,000.

In summary, producer marketing decisions are based on board prices, elevator and community loyalty, and other variables. Because of the rate incentives at only some elevator facilities, provided by the railroad, board prices may be higher resulting in longer truck movements. It is difficult to quantify the longer movements, and truck costs would be a determinant of those movements. Because of the lack of terminal costs associated with trucking costs they are very

close to linear. The simulations in this report show a range of impacts – from a small increase in draw for Berthold to doubling the draw for Milton. These changes do result in longer truck movements, and varying highway impacts. These impacts are also offset by the 21 cent per gallon state fuel tax and other user taxes not taken into account. However, it is important to remember that the road impacts are likely to occur for several years into the future. That is, the road impacts will occur annually for a period of years. There may be cases in the future where facilities are located where the highway infrastructure is not adequate to handle the truck traffic. In these specific cases, large infrastructure investments may need to be made.

Adequacy of Rail Regulation

The recent controversy surrounding the 110 car shuttle train program and inverse rates raises a larger question concerning the adequacy of rail regulation and, additionally, how should railroads be regulated, if at all. There seems to be a popular perception among certain groups, such as the country grain marketing industry, that the Surface Transportation Board (STB) has been less than effective in interpreting and applying rail regulatory laws. Further, there is a perception that the STB has a positive bias towards the rail industry. This leads to the question of why hasn't anyone used the simplified rate guidelines procedure to challenge a rate? In view of these perceptions should current railroad regulation be changed in someway to strengthen the interests of the shipper? A more fundamental question arises regarding treating railroads like other industries. Should railroads be totally deregulated and subject to oversight by the Federal Trade Commission and the Department of Justice, governed by antitrust law, and stripped of their antitrust immunity? Would shippers and railroads both be better off under such a scenario?

These are merely questions which raise issues of a subjective nature. Economics, political science and other disciplines can provide valuable insights into such questions, but the answers still remain largely subjective. Thus, it is highly appropriate that these issues be debated before and decided by the United States Congress.